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NG January 2009

Material, literary narrative and cultural economy: Primo Levi and the industrial short story

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Abstract

In this paper I argue that thinking about the material in cultural economy has much to gain from culture itself. Specifically, I explore the potential of literary narrative for conceptualising and writing material within a performative cultural economy. Drawing on the industrial short stories of Primo Levi (*The Periodic Table*, *The Wrench*, *A Tranquil Star*), I provide firstly a literal reading of these works, highlighting their foregrounding of material encounters, the importance of process (and not just product), and materials' instability in process, and their connections to theorisations of economies as assemblage (Section 3). In Section 4 of the paper I explore secondly how Levi writes material to presence using the techniques of narrative discourse, particularly mimesis. The paper concludes by arguing that narrative is a means to writing a performative cultural economy and that cultural economy needs to rekindle the arts of story-telling. Paying attention to literary narrative shows how this might be achieved.

Key words: material, literary narrative, materiality, Primo Levi

1: Introduction

This paper has two objectives. First, it aims to animate thinking about physical material within cultural economy. Secondly, it explores the potential of literary narrative within a performative cultural economy for both conceptualising and writing material. Two points underpin this position. One is the immateriality of much current work in cultural economy.¹ The second is an almost paradoxical dissatisfaction: that notwithstanding its emphasis on culture, cultural economy has paid little attention to the diversity of cultural texts and cultural analysis that might be brought to bear on its object. The point about cultural texts and cultural analysis connects with that about immateriality. It is precisely because culture was understood and approached in particular ways initially that cultural economy retreated from the material register. Thus, the earliest work in cultural economy focused on that which had already been prefigured as cultural, namely particular industries (film, advertising, music, fashion) and iconic products and brands (Sony, Apple, Nike). More recently, and as a response to this, quotidian goods have attracted more attention, particularly in the interstices between cultural economy, material culture studies and consumption. Nonetheless, whilst these studies afford greater prominence to the production and manufacture of material goods, their primary concern remains culture's role in the supply chain, in retail and in consumption.

Whilst there have been various manoeuvres in the social and human sciences more broadly towards taking materiality seriously, prevailing interpretations tend to take their inspiration from Bruno Latour's renditions of the non-human or Donna Haraway's human-machinic hybrid monsters and cyborgs (Latour, 1987, 1988, 1993; Haraway, 1991, 1997). Indeed, these

¹ An indication of the absence of the material register from performative cultural economy is provided by Amin with Thrift (2007), Table 1 p. 148.

perspectives feature prominently in arguments for a performative economy (Mackenzie, 2004; Mackenzie and Millo, 2003; Thrift, 1999, 2000a, 2000b). In contrast, whilst in accord with many of these writers, Andrew Pickering has consistently flagged the importance of extending the non-human to encompass physical material, that is, molecules, atoms, compounds, to acknowledge their agency and liveliness (Pickering, 1995, 2001, 2005). Resonant with Jane Bennett's (2004) arguments about an inclusive vital materialism, Pickering's work highlights that material practices are about trying to get the material world to do something for the human but that resistance and accommodation are integral to the temporal dynamics of human-non human conjunctures or 'couplings' (Pickering, 1995). Moving beyond science studies in his more recent work, Pickering has flagged the importance of post-humanist perspectives to the study of production complexes (Pickering, 2001), focusing empirically on the development of the synthetic dye industry in nineteenth-century Europe (Pickering, 2005). It is this perspective on materiality, with its insistence on the liveliness and vitality of physical material, and the implications of these capacities for economic activity, that underpins this paper.

To return to cultural economy, however: whilst the retreat from physical material is explicable, the failure of cultural economy to pursue the full potential in cultural analysis is more surprising. In part, this failure is down to that in both its weak (additive) and strong (transformative) forms (Amin with Thrift, 2007), cultural economy continues to be defined against and in relation to varying conceptualisations of economies and not, by and large, in relation to cultural analysis (and see too Amin and Thrift, 2004). This is as true for those who hold to the culturalisation thesis as it is for those who contest it. The implications of this are considerable. What is at stake here is what economy is and how it is to be thought about; culture's role, depending on the variant of cultural economy, is either to modify or to transform economy. With the clamour about economy, though, rather less attention has been paid to types of cultural analysis. Instead, culture just is, to be accessed through a slew of relatively straightforward social science methods.

In this paper I take a different tack. I highlight the potential in cultural analysis and cultural texts for thinking about cultural economy, and physical material within cultural economy in particular, pursuing this through a focus on literary narrative, specifically the industrial short

stories of Primo Levi.² In working with literary texts to explore physical material, I am drawing on Mieke Bal's development of Benjamin's arguments about the mimetic work of translation (Bal, 2002). Working from Benjamin's statement; 'While content and language form a certain unity in the original, like a fruit and its skin, the language of the translation envelops its content like a royal robe with ample folds' (Benjamin, 1992 p 76), Bal shows how the image de-centres and liberates the potential of the original through translation. My interest in literary texts' potential with respect to writing the material, then, is not in their capacity to represent physical material accurately (or not), but in how their translations enable us better to see physical material, and its capacities, in cultural economies.³ To take such an approach is to run counter to existing accounts of materiality in the social sciences, in which – notwithstanding the diversity of perspectives – science-technical languages of direct correspondence prevail as textual strategies. It is, however, entirely commensurate with my broader argument, that thinking about material has much to gain from culture itself. More specifically, in highlighting how Levi's industrial short stories both enable the development of thinking about the material in cultural economy and showcase writing about physical material, I show how economies, as well as the material in economies, can be illuminated through narrative. As I hope to demonstrate, Levi's stories are both worthy of attention in themselves and have profound implications for possible future directions in cultural economy.

2: Primo Levi and the industrial short story

Perhaps better known for his witness writings on Auschwitz and its aftermath (*If This Is A Man, The Truce, The Drowned and the Saved*), and as the key interlocutor for Agamben's earliest forays in bio power, Levi's *oeuvre* extends further, encompassing *The Periodic Table*, a part autobiographical, part metaphorical set of stories based on the characteristics of 21 elements; *The Wrench* – a frame narrative centred around the figure of Liberto Faussone (a 'rigger'), who tells stories of bridges, cranes, derricks, pylons to a listener figure (an industrial chemist); as well as short stories and science-fiction short stories, several of which touch on material and matter as key agents in economic activity.⁴ Intensely metaphorical and highly

² To focus on the short story is not to privilege this literary form over others, nor to say that literary representations of physical material are confined to the short story. Other fictional genres may be as worthy of investigation, including, for example, science fiction. Nonetheless, as I show below (Sections 4 and 5), the short story is of particular interest for its ways of working with narrative.

³ Of the key social science writers on materiality, only Haraway works in an overtly literary manner. She too flags the potential in narrative but stops short of working in narrative to write physical material.

⁴ Gordon (2007) provides the best introduction to Levi scholarship (and see: Patruno (1995), Pugliese (2005)). Whilst the majority of work continues to focus on the Holocaust, survivor/witness testimony

ethical, Levi's short stories featuring molecules and compounds are frequently anthropomorphised. For all that, and akin to Pickering's arguments, they quietly insist on the distinctive qualities of the molecular and atomic world: to resist and refuse human intentionality, and more, to effect, to turn human worlds upside down, and to generate horror, panic, fear. The same qualities infuse *The Wrench*, albeit that the settings here are consistently industrial, factories, process infrastructure, laboratories, site visits to clients.

Drawn from a lifetime of working with paints and resins, as both an analyst and a manager⁵, the stories in *The Wrench*, as well as many in *The Periodic Table*, are often barely concealed literary re-workings of events in which Levi was involved (Angier, 2002; Belpoliti and Gordon, 2001; Cicioni, 1995; Thomson, 2003). As such, the stories can be read not only as fictional narrative but as an attempt to convey specific trades and professions, particularly but not exclusively the Italian chemical industry in the post-war period. In order to open-up material's presence within economic activity therefore, I work initially with Levi's industrial stories⁶ in the literal sense (Section 3): to establish what they have to say about working with materials at this particular conjuncture.⁷ Three points emerge. First, to work in particular professions is to encounter material. Second, to take encounters with material seriously necessitates engagement with industrial processes and not just the products of processes. Third, material always has the capacity to resist intention. As such, industrial process work needs to be thought of as potentially unstable, in short as a becoming accommodation that requires much to make particular materials and material configurations cohere and endure. Taken together, these three points have profound implications for conceptualisations of

and Jewish culture and identity, Levi's writings speak additionally to ethics, science and industrial work, as well as to debates in Italian and European literature (see, for example: Antonello, 2007; Belpoliti and Gordon, 2007; Cannon, 1990; Cheyette, 1998; Cicioni, 1995; Frassica, 1990; Gordon, 1997, 2000, 2001; Harrowitz, 2001, 2007; Hartman, 2001/2; Kremer, 2001; Pireddu, 2001; Tarrow, 1990).

⁵ See Chapter 3 of Cicioni (1995), Angers (2002), Roth (1986), Thomson (2003). Having worked initially for Avigliana, in the late 1940s Levi moved to SIVA, where he remained until retiring in the late 1970s. By the 1960s SIVA was producing enamelled electrical conductors for various uses. Its primary product PVF (polyvinylformale) was developed by Levi and Gianna Balzaretta. Levi's later managerial roles combined quality control, research coordination and customer service.

⁶ The primary texts are: Primo Levi (1985) *The Periodic Table* (translator: Raymond Rosenthal) London: Abacus; Primo Levi (1987) *The Wrench* (translator: William Weaver) London: Abacus; and Primo Levi (2007) *A Tranquil Star* (translators: Ann Goldstein and Alessandro Bastagli) London: Penguin. Subsequent textual abbreviations are: *TPT*, *TW* and *ATS* respectively.

⁷ The historical and geographical specificity of Levi's story-telling is important to note. In the latter part of the twentieth-century, practices of working with materials – at least in certain parts of the world – were increasingly inflected by discourses of health and safety and the parallel rise in automated and/or robotic technologies. Nonetheless, routine process work continues to affect workers' bodies, as well as the health and well-being of those living in proximity to industrial plant (and see too Thomson, 2003: 390 – 93).

economies, and not just cultural economy, which I spell out. However, to approach Levi's industrial stories purely thus would be to do a serious disservice to his skill as a writer. Above all, perhaps, Levi's stories disclose a means to write the material in literary narrative. 'Livered' paint, contaminated resins, towers threatening to explode, are not perhaps the likeliest subject-matter for vital stories, but Levi's story-telling does just that, weaving tales that not only bring material to life, showing its co-constitution of subjects and subjectivities, but finding a means to write material to presence through narrative. In the fourth section of the paper therefore, I focus on how Levi writes material, drawing on two of his paint stories. The paper concludes by reflecting more broadly on literary narrative's potential contribution to furthering the development of cultural economy and by arguing for narrative as a means to write performative cultural economies.

3: Encountering material in production processes

Towards the end of the story 'Tiresias' (*TW*), Faussone's interlocutor, an industrial chemist, states that their professions 'teach us to be whole, to think with our hands and with the entire body [... they] teach us to know matter and to confront it' (pp 52 – 3). Although the relation of matter and body is described as external, as a confrontation of body against matter, it is also understood as internal, as an embodied learning relation in which working with matter teaches the 'know-how' necessary to work with particular materials. Hence, in 'Beating Copper' (*TW*), when Faussone – in the throes of telling a story about his father, the agon of fathers and sons, and of the demise of artisanal workshop production in Northern Italy – remarks, "As you probably know, when you hammer copper, it hardens ..." (p76), the remark resonates with his interlocutor:

"I did know that; and as we talked, the fact emerged that, although I have never hammered metal plate, I did have an old acquaintance with copper, marked by love and by hatred, by silent furious battles, enthusiasm and weariness, victory and defeat [...]. I knew, yes, the feminine, yielding quality of copper, the metal of mirrors, the metal of Venus; I knew its warm glow and its unlikely taste, the soft blue-green of its oxide and the glassy blue of its salts. I knew well through my hands, how copper hardened; and when I told Faussone we felt a bit like relatives." (pp 76 – 7)

Antonello (2007) suggests that this type of writing is simultaneously philosophical, epistemological, aesthetic and ethical, as well as literary (and see too Gordon, 2000). It provides a sustained engagement with the concept of *homo faber*, or man-as-maker, tool-maker, and fabricator, who – through work and tools – transforms the natural into the artefactual. At first sight, indeed, Faussone appears as Arendt's quintessential *homo faber*

(Arendt, 1958); a builder of bridges, pylons, towers, derricks and cranes, whose heroic acts of construction – often in extreme environments – are materialised in structures which, he hopes, will outlive and memorialise his actions. To read *The Wrench* purely as a literary rendition of Arendt, however, would be misplaced. Antonello underscores the close affinities between Levi's writing and Bachelard's *Le Matérialisme rationnel*, highlighting that

“for Bachelard as for Levi, the homo faber does not operate through abstract mental schemes, but mainly through direct, sometimes painful, contact with matter, which engenders a form of cognitive response that is channelled through the body and through the senses” (2007: 98).

Close reading of Libertino Faussone's stories discloses exactly this. Faussone conjoins manuals, plans, wrench and often painfully acquired know-how in each structural realisation, in so doing transforming designs, plans and instruction manuals into material manifestations through a combination of materials, hand, wrench and head. Whilst know-how might be insightful, even helpful, in the sense of stocks of knowledge to be drawn on, each structure is nonetheless unique, a new form of direct contact. For the rigger, therefore, transforming matter is invariably more encounter than conquest.

For the 'rigger-chemist', dealing with matter is similar but also harder. Taking a paper napkin, Faussone's companion sketches an example of a chemical molecule, going on to say:

“With a bit of experience, it's easier to tell right away the structures that can work from those that will be unstable or immediately go to pieces, and also from the other kind that are possible only on paper. But we are still blind [...] and we don't have those tweezers we often dream of at night [...] that would allow us to pick up a segment, hold it firm and straight, and paste it in the right direction on the segment that has already been assembled [...] for the present we don't have those tweezers [...] you people are luckier, because you can watch your structures grow beneath your hands and before your eyes, and you can check them progressively as they come up, and if you make a mistake, it's easy to correct it”(TW: 144).

Working blind, trying this and then that, with no guarantees of success, the chemist's relation to matter is not conquest, nor one of straightforward transformation, but rather an altogether humbling and frustrating experience, that – whilst it may succeed – can equally end up as a messy, stinking failure ('Nitrogen', *TPT*). Further, each attempt at synthesis is a unique event,

a different encounter in molecular architecture (Barry, 2005).⁸ Compare Bensaude-Vincent and Stengers (1996):

“[...] the chemist [...] cannot act directly on materials. He has to delegate operations, to entrust them to intermediary molecules put to work in a flask. Their activity must be directed to a definite site in the molecular structure, to break a bond here, form another there. This requires constant tweaking and great skill, for each time a reagent is introduced, it tends to operate everywhere indiscriminately [...] The synthetic chemist therefore has to invent a device to limit its activity, design a pathway and drive the reaction as a function of the available reagents. The precise order in which the different reagents enter the process has to be determined, the stages managed, and intermediaries with protective groups (“scaffolding” constructed to maintain certain pieces of the structure intact while the others are being worked on) created. It is an art in which delegation – letting the reagents react – and manipulation – getting them to act where and as one wants – are required.” (p. 157).

Whilst the outcome of successful synthesis may look as *homo faber*, the practice is far more provisional; it is negotiated, painstaking work of attempted ordering, an experience characterised by the singularity of the encounter.

It is, perhaps, the experience of encountering the material world that is hardest to grasp for those, such as social scientists, who work primarily with words (and see too: Pickering, 1995). Dwelling on this in ‘Tiresias’ – at a conjuncture, not un-coincidentally, when he is about to become a full-time writer – Levi draws a sharp distinction. He contrasts both Faussonne’s and chemists knowing of matter with matter for the writer, stating: ‘paper is too tolerant a material. You can write any old absurdity on it, and it never complains’ (TW p. 48). Paper permits any thought, any sentence, any running together of words. It neither resists nor defies, but rather admits the botched and the futile as well as the utterly profound. Unlike the rigger or the chemist, being imprecise carries no penalties for the writer:

“if our structures fail nobody gets killed [...] we’re irresponsible, and no writer has ever been put on trial or sent to jail because his constructions come apart” (TW p. 52).⁹

⁸ As Barry (2005) comments, chemistry is seen by some as distinctly uninteresting, as embracing a naïve mechanism and atomism, and as strictly a service science. He goes on to argue that this is to miss that chemistry’s significance lies in its ‘attention to the singularity of the case’ (p 52). Chemistry, Barry suggests, is best thought of as ‘a new form of empiricism [...] produc[ing] substances which cannot be derived from general laws’ (p 53).

⁹ There are, of course, other penalties for writers, who clearly have been sentenced for what they have written, with Alexandr Solzhenitsyn and, more recently, Salman Rushdie being prime examples. Levi’s point remains, however. Whilst words and writing carry ethical responsibilities, if writer’s constructions crumble or crack they do so because their ideas are attacked by others, and not because of their fabrication in paper, ink, or on the screen.

The professions of writing (academic, intellectual, writer, journalist), then, not only fail to teach us to know matter, they allow the luxury of disregarding it. As Levi's work shows, other professions and trades know matter differently, constituting humility in their subjects, who work with, are curbed by, learn from and take responsibility for their encounters and fabrications with material.

A corollary of thinking about material through the encounter is that processes and practices of material transformation, as well as products, assume centre stage. Descriptions of process work figure strongly in several of Levi's industrially-based stories, many of which draw on the manufacture of paints, resins and varnishes. Whilst Levi utilises his own working experience to recount synthesis, other stories feature the monitoring and sampling work of operatives. Process work for the latter is mediated by inscription devices and instrumentation, and is portrayed as known through the normative and the perceptual; that is, as processes that, after a given duration, should disclose recognisable patterns, lines and traces on graphs, and as states that should look a particular way:

“Morra [...] left me the production note with all the materials checked off at the right times [...] so there was nothing out of the ordinary [...] everything was going well. Day was just breaking and you could see the mountains almost close enough to touch. I glanced at the thermograph, which was functioning properly; there was even a bump on the curve at four in the morning registering fifteen degrees higher. It's a bump that appears every day; always at the same time [...]” (‘The Molecule's Defiance’, *ATS* p 150).

Alternatively, as in ‘Sulphur’ (*TPT*), process work is characterised by long periods of apparent nothingness punctuated by the movement of a needle:

“After half an hour, the thermometer began to move, as it should: the hand of burnished steel, slithering like a snail over the dark, yellow face, came to a stop at 95 degrees [...]. Lanza was satisfied and obscurely at peace with the boiler, the thermometer, and in short, the world and himself because all the things which should happen were happening.” (pp 160 – 161).

Allowing space for day-dreaming, and being paid to do little other than open (and close) a valve here or there, or merely just watch, process work appears, at first sight, to sustain a radical separation between operatives and material, to be a very different – distant and mediated – encounter with matter to that of Libertino Faussone and the industrial chemist. Except that, in both stories quiescence and the normal are about to be shattered, abruptly. Presaged by subtle changes in sound – in the tone of the agitator and the chatter of the pump – what follows are processes that begin to go, rapidly and radically, wrong, requiring

instantaneous interventions from the operative, whose own life (as well as that of others) is acutely threatened by the process. In a manner not dissimilar to Faussone, both Rinaldo and Lanza – the key protagonists in these two stories – draw on stocks of subconscious, latent, and practical knowledge to avert their crises, and to contain them within the boundaries of the plant. The more significant point that Levi is surely making, however, is that these moments when process spirals out of control are not uncommon; they are an everyday part of process work, of fabricating in materials, and a constant reminder of matter's capacity not just to defy but to threaten, maim and annihilate human life.

Material's capacity to unhinge processes has other clear effects. Batches are ruined ('The Molecule's Defiance'), infrastructure damaged ('Cloistered', *TW*). Yet Levi's stories go further, detailing how material can impinge on transactions, orders, profit and loss, and showing how the displacement of products through the supply chain can return to affect, even cast doubt on, the quality and accuracy of anterior process work. Thus, in *Anchovies I and II* (*TW*), the reason for the industrial chemist's sojourn in the Soviet Union is revealed as an attempt to salvage a problem with a resin which, when used as an enamel for packaging anchovies, consistently lumps and corrodes. Similarly, 'Vanadium' (*TPT*) – a story which allows Levi to return to Auschwitz, to examine German culpability and guilt – is set against a background of product/process failure, client relations and the legal ramifications of commodity production. Again, Levi is making a broader point: process work does not end with materials coherence in the point-of-sale commodity. Rather, it is folded within the intricacies of buyer-supplier networks, and subsequent material acts, all of which have the capacity to act-back on, and to call question on the quality of, a plant's process work. Hence, the importance of materials-monitoring, not just to control process, but to audit process in its enactment, to generate inscriptions, the record that verifies and protects against the legal challenge, safeguarding the transaction, orders and markets through the surveillance of materials.

These three points – the material as encountered, the importance of process and material's instability in process – have profound implications for conceptualisations of economies. Read literally, Levi's industrial stories provide a reading of materiality that resonates with the arguments of Pickering and Bennett. Furthermore, they show that to take material and material transformations seriously goes to the heart of understandings of the labour process, work cultures and markets. But they also insist on the non-linear character of industrial process work, on the becoming of products, and on the importance of material states and

transformations, both to the becoming of products and to product coherence. As such, Levi's stories can be put to work: they disrupt accounts that overly privilege the point of sale commodity and which, in so doing, portray economic activity as more or less linear, more or less stable, and – through the manipulation of materials and technologies to purposeful ends – as thoroughly human-centred. Moreover, they urge that physical material be conceptualised both as actants and within assemblages. More strongly still, Levi's stories affirm the merits in thinking economies through assemblage. Paying heed to Levi's cultural texts certainly expands the compass of a performative cultural economy to include industrial mass production whilst demonstrating a broader point, that cultural texts can enhance conceptual understandings of economies. More than this, though, there are lessons in Levi's stories for another facet of the performative, namely how to write material in a cultural economy. It is to this issue that I turn in the next section of the paper.

4: Writing material

Levi's literary writing is, almost exclusively, in the short story form and, as such, repays analysis within this distinctive canon. In general, Levi's industrial stories have more in common with Conrad-ian narrative than with the contemporaneous modernist short story. Indeed, as a writer Levi largely eschews 'epiphany', uncertainty and ambiguity, in favour of entangled frame narratives. Moreover, his stories cohere, at least partially; they frequently offer explanation; and they do not engage with aporia and ellipsis. Yet, at the same time, as Gordon (1997) insists, Levi's is a profoundly ironic, as well as ethical, style and his attention to the fragmentary, experiential qualities of industrial working life admits to a fractured subjectivity. These short stories, then, whilst not narrative at the limits of the possible, are narratives that write in the moment. Indeed, much of my interest in how Levi writes the material is exactly this: in how he writes material to presence, moving it from absence to presence through particular narrative devices. Two of Levi's paint stories suffice as illustration.

'The Molecule's Defiance' (*ATS*) is a double-ended frame story, which begins in an office setting. The protagonist, Rinaldo, is unburdening himself to a manager figure (Levi, the 'I' of this story), wanting to change his job, do anything but work in a paint factory, run away, be released from any sense of responsibility. Whilst Rinaldo is represented in the staccato of direct speech, Levi's voice – as befits his situation and role – is reported, calm, measured. The difference drawn in writing between the two figures and the staging clearly hint at the

occurrence of some traumatic and traumatising event. We learn what this event is very quickly: Rinaldo has had a batch spoil on him; or, in more technical terms, premature polymerisation has occurred. Relayed perfunctorily, as an acknowledged part of paint fabrication (through a detached, matter-of-fact: 'it shouldn't happen but sometimes it does'), the event is overshadowed by Levi's own concerns. Levi portrays himself as struggling in his managerial role, as uttering an inappropriate platitude, regretting it, not knowing what to do or say, and resorting eventually to the cognac bottle. The reader is clearly invited to put the question: to reflect not only on the management role, its demands and the quieter psychological traumas of work-related counselling, but also on Levi's capacity to be the manager. The opening of the cognac bottle, however, presages the move to a second narrative, the chronological re-telling by Rinaldo of the batch's spoiling. Recounted in lengthy direct speech, which works to focalise the reader with Rinaldo's point of view, in his thought processes, and privy to the wanderings of his mind, the section moves from diegetic modes of story-telling, through partial and mid-mimesis, to full mimesis, at the point when the process goes out of control. Full mimesis, therefore, is reserved for the telling of a specific material state:

““A mass of foam was rising, slowly but relentlessly. Coming to the surface were bubbles as big as a man's head but not round: deformed, in all shapes, with the walls striped as if with nerves and veins; they burst and immediately others formed [...]"” (p 153)

And for the denouement, with its echoes of Mary Shelley's *Frankenstein*:

““The hatch rose by itself, not suddenly but gently, solemnly, as when tombs open and the dead arise. A slow thick stream came out, disgusting, a yellow mass full of lumps and nodules"” (p. 154).

The story closes with a reversion to the initial frame, and its extension to broader scientific moralities. Although 'The Molecule's Defiance' is not a destructive accident, it is nonetheless a tragedy for Rinaldo, the heroic, responsible worker, whose actions averted a major incident, yet who has been contaminated by the mockery of matter, rendered the unwitting victim, whose guilt can never properly be assuaged. Levi too, as the manager for whom there is nothing that can be said, is also a victim. But more broadly still, Levi uses 'The Molecule's Defiance' to highlight 'the prevalence of confusion over order', 'death over life', and 'ugliness without reversal'. His point seems to be that, whilst industrial processes are ostensibly about ordering material, the experience of being scorned by material both leaves a lasting trace and hints further, at the potential effects of other ugly things 'without reversal or remedy that obscure our future'. Industrial accidents are but a forerunner here of the threat of a nuclear future.

‘The Molecule’s Defiance’ is one of Levi’s bleakest industrial stories. Rather different is the much earlier ‘Chromium’ (*TPT*), a story of rebirth. Almost exclusively diegetic, this is a multi-layered, single-ended frame story, narrated by Levi. ‘Chromium’ begins with a familiar work-related scene, which also testifies to the pervasiveness of story-telling in work cultures (Bal, 1997; Herman, 2007). A group of Italian industrial chemists of varying ages is sat around a dinner table telling stories about tradition. The opening sentence hints at what is to come: ‘The entrée was fish, but the wine was red’. Disrupting of custom and tradition, it prefigures both a concern with habitual, unexamined practices and the presence of an unusual substance. Stories told about food customs mutate to a hybrid story, involving onion and boiled linseed oil. Part food story, part paint story, and told by Levi, this story turns on the inexplicable presence of onion in a prescription book. It sets in motion a further round of similar tales, which culminates in a moment of self-realisation, in a tale that is unexpectedly closer to home. Another chemist recounts a story about finding ‘a formula of a chromate-based anti-rust paint that contained an absurd compound’ (ammonium chloride). It is Levi who is responsible for this formulation, although whether he discloses this to his colleagues around the dinner table is unclear, for this story provides the impetus to shift to the autobiographical register, to another time and place. The second part of ‘Chromium’ is both autobiographical and archaeological. The reader is transported to Italy in 1946, and to the Levi of *If This Is A Man*; a figure ‘closer to the dead than to the living’, a latter-day Ancient Mariner. Working, but not working, in a paint factory, Levi is eventually confronted with a pile of ‘livered’ paint. Echoing piles of corpses in another place, Levi switches the mode of story-telling from diegesis to mimesis at precisely this juncture, revealing the horror of this material as it appeared:

“He took me to the corner of the factory’s yard [...] piled up at random, the lowest crushed by the highest, were thousands of square blocks of a bright orange colour. He told me to touch them; they were gelatinous and softish; they had the disagreeable consistency of slaughtered tripes” (p152).

Tasked with making what he can of this past production calamity, ‘of sticking his nose into past mistakes’, what follows is a part archaeological, part forensic detective story, as Levi unearths the problem (too much reagent in the chromium), tracing the error to an erasure on a file card that subsequently was instantiated unquestioningly in the production process. In line with good scientific practice, thorough testing of samples ensues, before materials recovery is attempted. The autobiographical story line parallels the detective story, with Levi meeting his future wife, figuring a return to ‘normal’ human life. But it is the effecting of the transformation of the livered paint, from solid to liquid, and its recovery from ‘waste’ to

‘commodity’, that is an extended metaphor for his own recovery, renewal and rebirth. Again, the critical moment in material is written in mimesis. At the point of releasing the manhole and opening the cover that will reveal the success or otherwise of his attempted recovery, Levi writes:

“there spurted out with a hiss an ammoniacal puff [...] the paint was fluid and smooth, completely normal, born again from its ashes like the Phoenix” (p. 158).

Tellingly, Levi marks both metaphorical and material states of return with a reversion to the diegetic mode of story-telling, resorting even to the factual, spare, perfunctory prose of scientific report writing. As with ‘The Molecule’s Defiance’, however, ‘Chromium’s’ end is with a broader moral commentary, pointing to the connections between formulae and tradition, custom and inertia, in industrial life, and their effects on those who work in these industries. ‘Probably a bit harmful’, Levi’s ammonium chloride continues to be added to that formulation because in the memory of those who work here it has ever been thus. To change it would be to do differently, to disrupt and simultaneously to realise superstitions. Yet, it is precisely blind obedience, the following of the unquestioned yet fatally flawed specification card that led to the initial livering. As well as a tale of rebirth, ‘Chromium’ is a morality tale, that we should always question, always ask why, even in those locations such as factories, where questioning is least encouraged.

What do these stories disclose about how narrative discourse might be mobilised to write physical material? Two points stand out. First, as with all good story-tellers, Levi weaves together story and plot in the telling, using plot to disrupt a straightforward chronology of events. In ‘The Molecule’s Defiance’, B (Levi and Rinaldo in the office) obviously comes after A (the batch spoiling), whilst in ‘Chromium’ the primary narrative is written as an extended analepsis. Moreover, in plotting Levi consistently allocates a pivotal agency to material. So, in both stories human actions are never entirely responsible for the key turn in events, but rather it is either material alone (the defiant molecule) or a conjuncture of human-material (the critical erasure of the ‘-‘ from the file card and the subsequent diligent addition of 23, rather than 2 – 3, drops of reagent). Material works here as a quasi-character and as a quasi-event; it both ruptures process temporalities and provides the events for story-telling that are then further orchestrated through the techniques of narrative plotting. As with many narratives, then, plot here becomes a means to write non-linearly, to work with order and duration, as well as frames, to disrupt the seamless, temporal flow of events. Second, when Levi writes the material in these two stories he works with two modes of writing, diegesis (in simple terms,

writing about) and mimesis (or writing as action unfolds, that is as imitative in its effects of the temporalities of the event). Diegesis, which may be written in scientific-technical language ('to neutralise [...] the excess of basicity due to free lead oxide [...] I thought of ammonium chloride, capable of combining stably with lead oxide, producing an insoluble and inert chloride and freeing the ammonia' - 'Chromium', p 158), but equally may be written in lay terms ('the third hand is the one that is supposed to catch hold later – when *we* decide' - 'The Molecule's Defiance', p 151), is reserved for representing ordered, controlled, material states. Its presence signals that all is proceeding normally, that is, according to human intentionality. In contrast, Levi utilises full mimesis only in those moments when process goes out of control, or when matter has refused to comply, that is, to represent an incipient and actual material state of disorder. Mimesis, then, works to narrate an alterity in economic activity that is constituted through materials vitality. Moreover, Levi does this in a way that not only imitates the experiential but which represents an elevation of (literary) narrative over scientific-technical language. In so doing, the implication is seemingly a broader ethical point, that whilst disorder may be explained, it is material's affective presence which matters most in industrial life, shaping, as well as mocking and contaminating, human lives. In the final section of the paper, I conclude by reiterating what Levi's stories have to offer a cultural economy and by reflecting on narrative's potential for writing cultural economy.

5: Conclusion

As Benjamin remarked in his essay on Nikolai Leskov and the dying art of story-telling, 'only a few (story-tellers) have ventured into the depths of inanimate nature' (p. 105). Leskov's story 'The Alexandrite' is one such journey; Primo Levi's industrial short stories are others.¹⁰ However, whereas for Benjamin the decline of the artisan trades and the rise in information precipitated a parallel decline in story-telling, for Levi, the 'inanimate' remained a resource for story-telling. Not simply confined to the artisan-cum-traveller figure of Libertino Faussone in *The Wrench*, Levi's 'inanimate' story-telling is set in the milieu of industrial mass production. The world he depicts is one in which working with physical material, in factories and industrial plant, is distributed across all economic activity. To work with material involves working simultaneously with profit (and loss), with supply and demand, in particular commodity markets, with transactions and orders, and within particular frameworks for governing materials. As I showed in Section 3, for much of the time and particularly for

¹⁰ Gordon (2000) draws similar parallels between Levi and Benjamin, highlighting the importance of story-telling to Levi's *oeuvre* and its connections to testimony and ethics in Levi's work.

operatives, material in this type of production system is an absent presence, known through the trace of monitoring devices, file cards and screen technologies. Nonetheless, a characteristic of this type of economic life is that material will come to presence, be this as batches ‘spoiling’ and piles of waste or as leaks, contamination, combustion or the cataclysmic accident. In this respect Levi’s stories affirm some of the lessons from the burgeoning field of accident and technological failure studies. These show that industrial scale applications, whilst often boring, can be a very long way from dull (Arnold, 1995; Perin, 2005; Perrow, 1999). Further, they confirm that fabrication is characterised by an array of contained leaks, uncontrolled leaks, accidental spillages, and less than accidental discharges, contamination and cross-contamination, as well as the more exceptional major incident (Bolter, 1996; Gille, 2007; Petryna, 2002). An endemic part of industrial and economic life, these events testify to the instabilities of industrial scale fabrication (c.f. Barry, 2001)¹¹ but these accounts have as their narrative frame the temporalities of the (narrowly-averted) accident. As such, everyday fabrication becomes but the precursor to, and part explanation for, the unravelling that is the accident itself, or its narrow avoidance. In contrast, Levi’s story-telling foregrounds day-to-day encounters with material. His is the everyday industrial world of fabrication and transformation, in which material is manipulated, handled, sampled and monitored, and in the process transformed; in which batches are produced or plants run under continuous processing; and in which things (inevitably) go wrong, precisely because physical material is not just a constant presence but a vital presence.

Relatedly, Levi’s stories show that to write about the everyday industrial world as encounter with material necessitates writing about process. Unlike many cultural economy accounts, his industrial stories are not confined to products. Rather, and as befits his emphasis on the encounter, they highlight the rhythm and ruptures of day-to-day process work as this occurs in materials and the labour process, in some instances without even recourse to a mention of product. Instead, all there is is process, ordered and disordered, going-on. The stories therefore centre material flows, treatments, handling, monitoring and recording; they disclose the non-linear reverberations of production and its products back into the production process; and they show the multiple spatialities and temporalities of process work that, through the intricacies of

¹¹ Barry (2001) quotes O’Leary and Miller, seeing ‘the factory as the locus and object of intervention [...] as a space for interfering under controllable and isolable conditions with matter and energy [...] as an intrinsically theoretical and experimental space, one where phenomena are created’ (p 202). Whilst it is possible to question the degree of control and isolation, I agree with Barry that the factory is an important site of calculation, observation, monitoring, technical practice and experimentation.

buyer-supplier networks, connect plants in myriad webs of chemical and paper transformations and transactions. There is much for cultural economy to learn from this. Nonetheless, borne of a lifetime of work in the chemical industry, Levi was steeped in the doing (i.e. the practice) of this work. An immediate question therefore is whether contemporary industrial process work can ever be as accessible to, or even remotely approach, such levels of scrutiny. Surrounded, on the one hand, by the doubly protective discourses of health and safety (which exclude outsiders as much as they shield workers' bodies) and by concerns over corporate confidentiality, and, on the other, by ethical protocols, the best that can often be achieved by researchers is escorted visiting. Levi's stories, though, point to where to look. Furthermore, figures such as Rinaldo, Lanza and Liberto Faussone flag the kind of stories workers might be prompted to tell, not autobiographical stories but process stories - monitoring stories, handling stories, near-accident stories.

As important is that to write a process-based understanding of material encounters becomes, in Levi's hands, an exercise in narrative writing. In a manner similar to historical narration, Levi, draws on both his and others' working lives to refigure material's coming to presence in economic activity, as a quasi-event. Matter here is a quasi-character, written through the techniques of narrative discourse, including the oscillations of diegesis-mimesis. Levi's point therefore seems to be that material can only be animated through narrative and in narrative. Thus, and in a manoeuvre not dissimilar to Ricoeur's arguments about time and narrative (Ricoeur, 1984), Levi uses narrative to configure material, fleetingly and affectively, in a human time that is simultaneously economic time. Material is brought to presence in an instance: to use Nadine Gordimer's evocative phrase, 'in the light of the flash' (c.f. 'Carbon', *TPT*).

Whilst cultural economy has begun to engage with story-telling and narrative, most notably through the work of John Law, understandings of narrative remain relatively conventional and underdeveloped. Indeed, in Law's *Aircraft Stories* narrative is dismissed in favour of the metaphor of the pin-board as a means to write the fractional coherence of the TSR2 (and see too: Law, 2004). Stories (and narrative) are seen here as singular, linear, chronological, ordered, in short as hindering how Law wishes to write this object. I want to say 'not so fast'. Undeniably, certain narratives are just as Law argues – smooth, grand, ordered and coherent - but not all are this, particularly literary narratives. As Hunter (2007) shows, the short story, from the late nineteenth century onwards, can be seen as an exploration in writing plotlessness,

in saying more through saying less, and in the development of narrative discourses of indeterminacy and open-endedness. Examining the short stories of Joyce, Woolf and Mansfield, Hunter shows how the experiential fragment is privileged over the eventful sequence; how narratives circulate, with no closure or resolution; and how stories refuse to come to order. Narrative discourse, then, manifestly can work with the moment, the fragment, disorder, mess, and it is in the short story form particularly that such writing is to be found.

This last point shows narrative's connection to the performative. As many literary scholars have argued, narrative is performative. I therefore find it difficult to follow John Law in his dismissal of narrative's potential for writing a performative cultural economy, in favour of the montage-pastiche of the pin-board. Perhaps the difficulty here is the elision of story and narrative? The art of narrative is less, as Law states, 'to make events into a story', but to work with narrative discourse to disrupt the temporal sequence of events that is 'the story'. There is no necessary coherence here. Moreover, we do not have to look so far as to modernist or post modernist writers to find such qualities. Thus, even in 'Chromium', one of his most accessible stories, Levi works with narrative to juggle time and memory, autobiography, the suspense of a mini-detective story, the place of story-telling in industrial life, the different experiences of generations of industrial chemists and a morality tale about custom and tradition, all in a few pages. Whilst one narrative coheres in a simultaneous human-material rebirth and revaluation, another – Levi's responsibilities in producing this formula and his status amongst his chemist peers – is left open, a question put but not answered. Such layered story-telling as well as compression is, undeniably, the work of a master craftsman but it is also illuminating of cultural economy. The story writes what cultural economy is arguing about economy, that it is not carved-off but rather an integral part of everyday life. More than this, it insists that this life, including economic life, is understood through narratives that both cohere and fragment. 'Chromium', then, highlights what cultural economy currently lacks; a means to work in narrative to write its difference, as a thoroughly *cultural* economy and as a narrated economy. The art of story-telling needs to be rekindled in cultural economy; literary narrative shows how this might be achieved, through the techniques of narrative discourse.

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